

Avian Vacuolar Myelinopathy

An Unexplained Neurologic Disease

“A mysterious brain disease is killing birds in the southeastern United States and scientists can’t find the cause.”
(CNN Web Site)



An unusual neurologic disease has caused the deaths of at least 69 bald eagles, an unknown number of coots and a small number of waterfowl wintering in 4 southern states. Affected birds have a very uncoordinated flight and appear intoxicated. Eagles have been observed flying into rock walls; water birds have been seen trailing a wing or leg while swimming,

lying on their backs in the water or crash landing. The disease, termed *Avian Vacuolar Myelinopathy* (AVM), was first detected in 1994, when 29 bald eagles were found dead during the fall and winter at De Gray Lake in southwestern Arkansas. USGS National Wildlife Health Center scientists described the disease, which had never before been documented in wildlife.

found outside of Arkansas in 1998 on lakes in Georgia and North Carolina.

In 1999, USGS scientists detected the disease for the first time in



waterfowl: small numbers of mallards, bufflehead and ring-necked ducks from North Carolina. Bald eagles from Georgia, North and South Carolina also died, and affected coots were found at new sites in South Carolina and Georgia.

During 1999-2000, 5 eagles in Arkansas and 2 in South Carolina were confirmed with AVM.



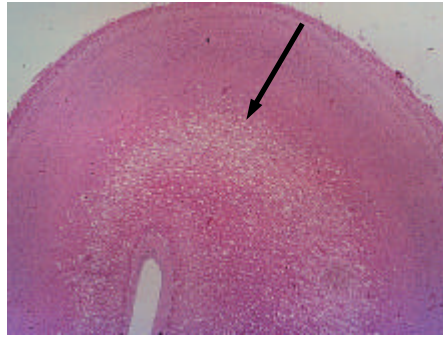
Affected coot.
Photo courtesy of T. Augspurger, USFWS.

It is believed that a man-made or naturally occurring toxin is the most probable cause of this disease. However, tests for a wide range of toxins — including those previously associated with vacuolar myelinopathy in other species — have been unsuccessful

In 1996-97, an eagle die-off occurred again on De Gray and two other southwestern Arkansas lakes. This time, at least 26 eagles died and American coots were also affected. Affected coots were first

A small number of coots tested positive on all of the same lakes as last year. To date, no waterfowl have been detected this year with AVM.

The most consistent finding across species, locations and years is a microscopic change or “lesion” in the brains and spinal cords of affected birds. This disorder is diagnosed by microscopic examination of very fresh brain tissue. It appears as open spaces in the white matter (myelinated areas) of the central nervous system in affected birds. Using electron microscopy, USGS pathologists have determined that the spaces are caused by separation of the myelin layers that surround and protect the nerves. The route of exposure to the toxin is not known at this time. This is not thought to be a prion



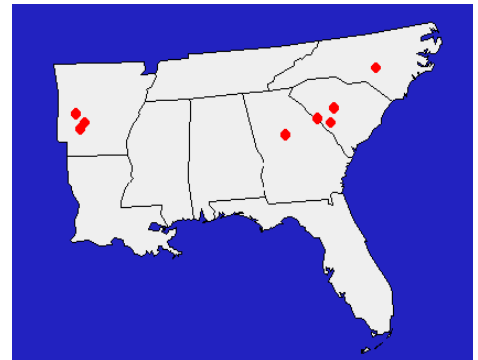
The small white dots represent spaces between the myelin layers surrounding the nerves.

related disease based on the lesion, laboratory testing and consultation with prion experts.

The USGS National Wildlife Health Center, in conjunction with multiple State and Federal agencies, is continuing collaborative field, laboratory and research efforts to determine the cause of the disease.

Wildlife biologists and managers are being encouraged to report observations of sick eagles, waterfowl and coots to the USGS National Wildlife Health Center.

For additional information please see the Center’s website at www.umes.usgs.gov/nwhc/home.html



Map of Southeastern United States showing mortality locations.